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ERRATUM

In the October, 1980 issue of *Microwave Journal*, the article, "Millimeter Wave Coupled Line Filters," by D. Rubin and A. R. Hislop was published without the computer program in the appendix detailing the even and odd mode impedances for doubly terminated Tchebycheff filters. It is reproduced here as follows:

APPENDIX

```
100 PRINT "PROG. CALCULATES ZOE,
    ZOO FOR TCHEBYCHEFF FILTER"
110 INIT
120 PRINT "Z0= ?";
130 INPUT Z0
140 PRINT "F1=, F2= ";
150 INPUT F1, F2
160 REM CALCULATE G VALUES (PG 99 MATTHAEI)
170 PRINT "N= ? "; "RIPPLE = ? ";
180 INPUT N, D
190 PRINT
200 X=D/17.37
210 E1=EXP(-X)
220 E2=EXP(X)
230 E=LOG((E2+E1)/(E2-E1))
240 X=E/(2*N)
250 G1=0.5*(EXP(X)-EXP(-X))
260 DIM A(N)
270 DIM B(N)
280 DIM G(N+1)
290 FOR K=1 TO N
300 A(K)=SIN((2*K-1)*PI/(2*N))
310 B(K)=G1↑2+SIN(K*PI/N)↑2
320 NEXT K
330 G(1)=2*A(1)/G1
340 IF N=1 THEN 440
350 FOR K=2 TO N
360 G(K)=4*A(K-1)*A(K)/(B(K-1)*G(K-1))
370 NEXT K
380 IF -1↑N<0 THEN 440
390 X=E/4
400 E2=EXP(X)
410 E1=EXP(-X)
420 G(N+1)=((E2+E1)/(E2-E1))↑2
430 GO TO 450
440 G(N+1)=1
450 REM CALCULATE ZOE, ZOO (PG 473 MATTHAEI)
460 W=2*(F2-F1)/(F2+F1)
470 G0=1
480 DIM J(N)
490 J0=SQR(PI*W/(2*G0*G(1)))
500 J(N)=SQR(PI*W/(2*G(N)*G(N+1)))
510 IF N=1 THEN 550
520 FOR K=1 TO N-1
530 J(K)=PI*W/(2*SQR(G(K)*G(K+1)))
540 NEXT K
550 PRINT " N    ZOE    ZOO    "
560 Z2=Z0*(1+J0+J0↑2)
570 Z1=Z0*(1-J0+J0↑2)
580 PRINT USING 590;1,Z2,Z1
590 IMAGE 2D.1D, 6D.1D, 6D.1D
600 FOR K=1 TO N
610 Z2=Z0*(1+J(K)+J(K)↑2)
620 Z1=Z0*(1-J(K)+J(K)↑2)
630 PRINT USING 640:K+1,Z2,Z1
640 IMAGE 2D.1D, 6D.1D, 6D.1D
650 NEXT K
660 END
```

EXAMPLE

```
RUN
PROG. CALCULATES ZOE, ZOO FOR TCHEBYCHEFF FILTER
Z0= ?85
 F1=, F2= 26, 34
N= ? RIPPLE = ? 5, .5

 N      ZOE     ZOO
1.0    148.0   63.8
2.0    116.7   67.5
3.0    109.9   69.6
4.0    109.9   69.6
5.0    116.7   67.5
6.0    148.0   63.8
```

(from page 52) NOVEL PIN

operated at a junction temperature of 100°C, was estimated to be 2×10^7 hours.

CONCLUSION

Using a new glass filled moat structure PIN diode chip, permits a compact high power X-band phase shifter in an MIC format measuring 20 x 41 x 10 mm and weighing below 0.7 ounces. Peak RF power ratings of 300 W (using 500 volt diodes) and 500 W (using 840 volt diodes) were demonstrated to be realistic thru a series of reliability tests, including an 8000 hour lifetest under RF power. This phase shifter design and its diode are well suited to airborne array antennas at X-band and above.

ACKNOWLEDGEMENT

The authors wish to thank M. Itoh and M. Kishita for their technical assistance.

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